Catchment management - moving forward.

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crew
Scotland's centre of expertise for waters

The challenge

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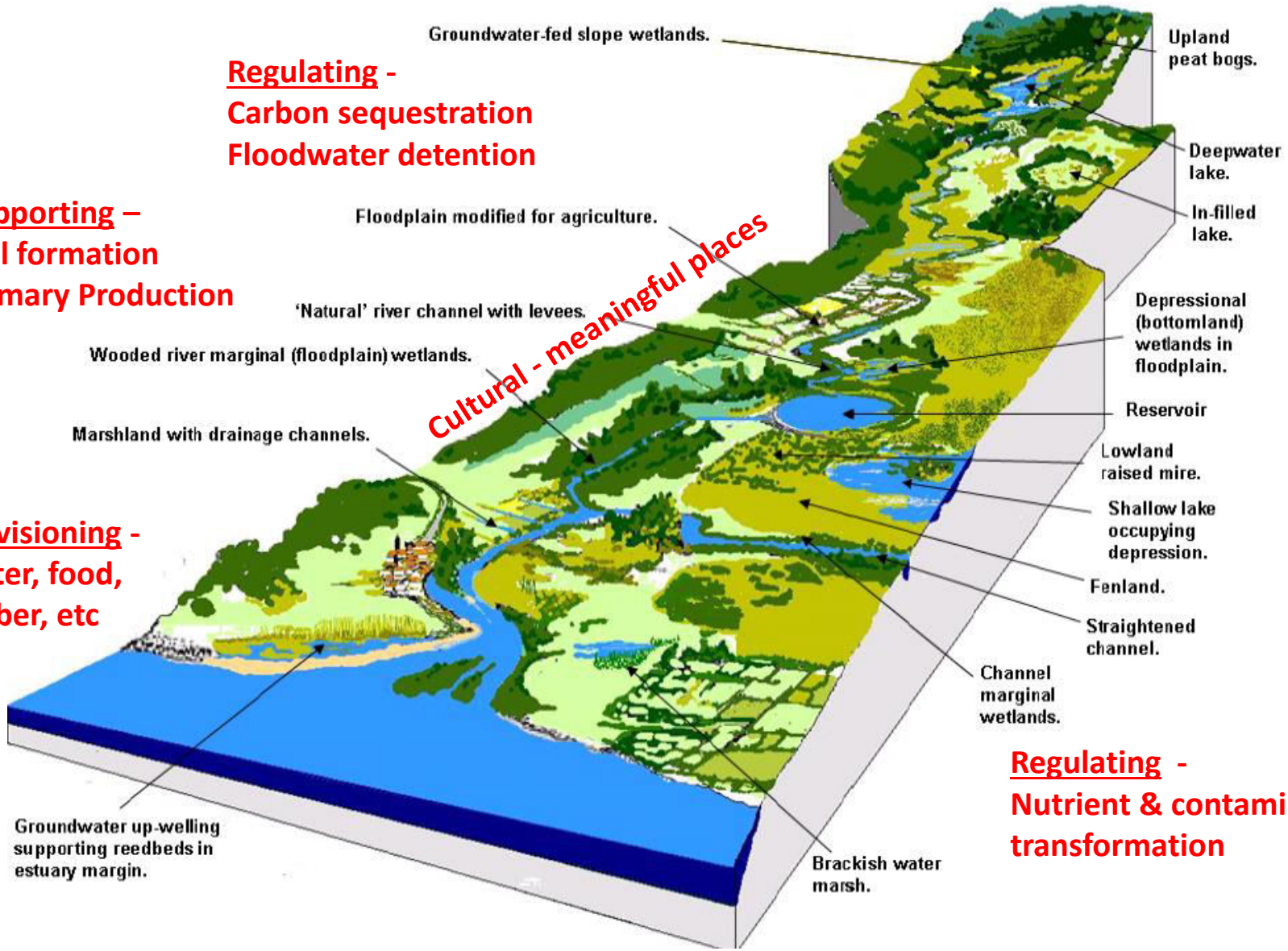
Regulating -
Carbon sequestration
Floodwater detention

Supporting –
Soil formation
Primary Production

Provisioning -
Water, food, timber, etc



Cultural - meaningful places

Regulating -
Nutrient & contaminant transformation

Where did we start?

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Historically;

- "water" (commodity and use-based) approach,
- focused on a single issue (sometimes a species level target),
- rather constrained policy perspective with definitive target thresholds,
- sort term goals driven by need
- but with an awareness of the need to address risk and uncertainty

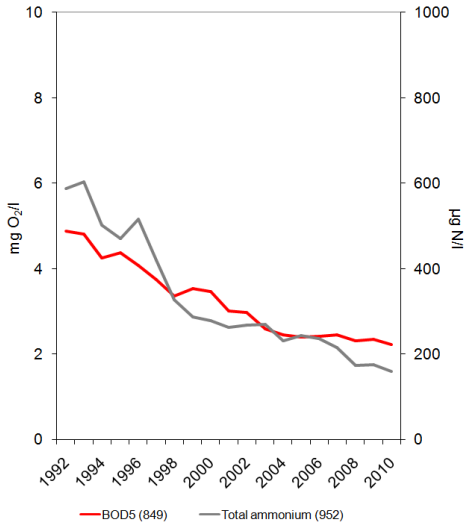
The challenge

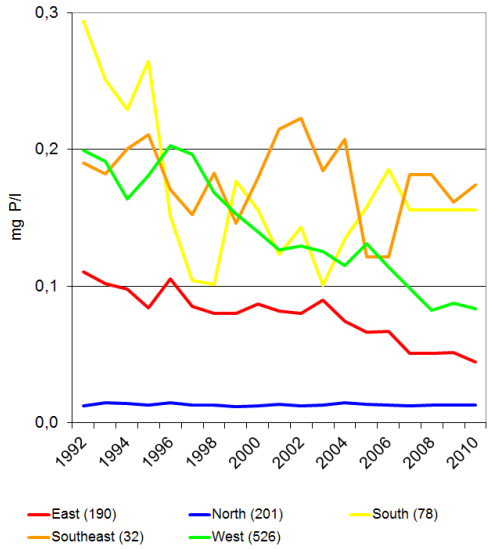
Integrated management

- **Economic**
  - water efficiency, costs and values
- **Environmental**
  - water resources, quality, fitness for use
- **Social**
  - institutions and governance: equity, inclusion, and efficacy

Co-constructed, and as part of an adaptive cycle

CM works!





"Water policy helps Europeans to continue enjoying high-quality bathing waters" European Environment Agency

"Over 80 per cent of countries have reformed their water laws and implementation strategies in the past 20 years which have produced significant impacts on development, including improvements to drinking water access, human health and water efficiency in agriculture".

"Tremendous progress has been made for each waterway in improving water quality, restoring valuable fisheries and other biological resources"

Where applied - CM has been a positive intervention

Supporting policy

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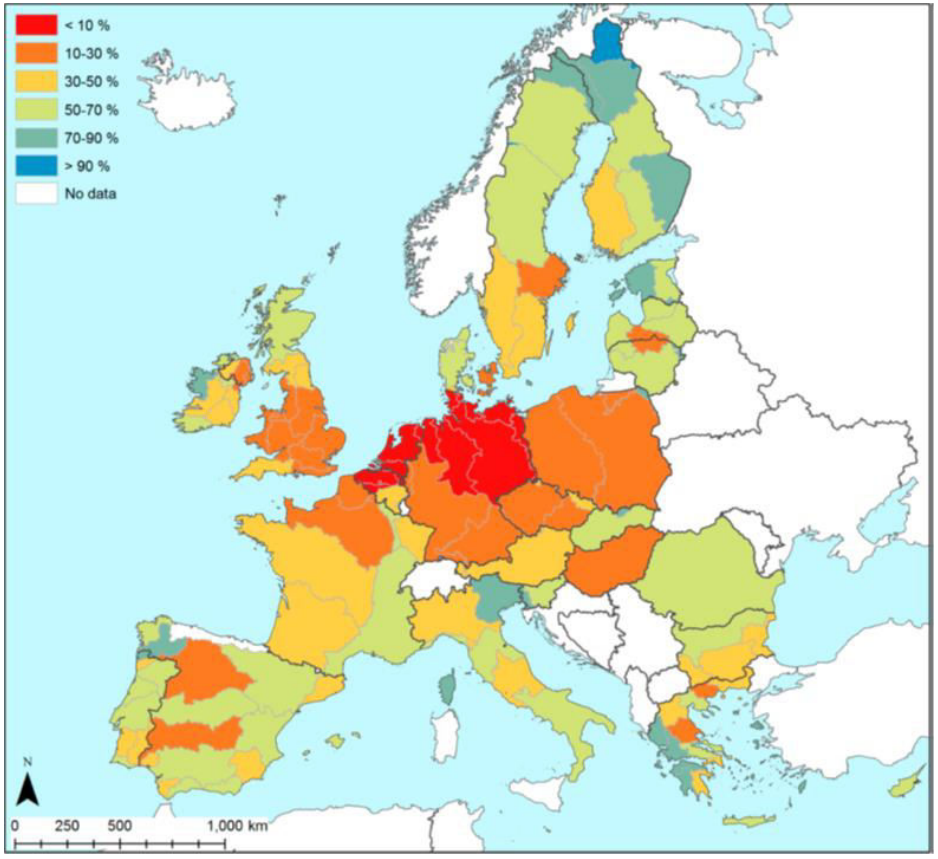
- Across the globe water policy has been developed and implemented
- Designed to meet the current and emerging issues in a regional context
- Built agreements across boundaries and other conflict zones
- Challenged science to support policy development

Policy Compliance: WFD



Main causes of failures;

- 31% Agriculture and rural land management
- 32% Wastewater effluent
- 14% Urban

- Phosphorus was the key pollutant in 60% of failures

Jarvie and Jenkins, Environmental Science & Technology , 2014,

Where are we now?

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Currently;

- integrated approach (ecological targets, ecosystem services etc.);
- focused on a multiple issues (water and flooding, diffuse and point source pollution);
- improved policy perspective across land and water with joint and shared goals;
- medium term goals (5-10 yr) integrated into policy cycles;
- awareness of the need to address non-stationarity.

New science challenges

- Address the non-stationarity generated by climate change uncertainty (new approaches- “analytics”, resilience theory, models etc.)
- Integrate further understanding in ecological functioning (habit diversity, INNS etc.)
- Improve the spatial and temporal coverage of data (emerging technologies, data visualisation etc.)
- Find new ways to integrated stakeholder perspectives (“games”, citizen science, policy engagement etc.)
- Develop principles and approaches for ecosystem restoration

What do we need to deliver?

For the future;

- integrated approach (ecosystem services to ecosystem functioning, service provision etc.);
- focus on a multiple issues (e.g. water-food-energy -environment, integration of a wider socio-ecological perspective including societal values);
- increasing cross-compliance and policy integration to meet multiple objectives;
- developing a longer term vision of sustainability;
- management to address uncertainty in a changing future;
- Link actions to cost-effective outcomes and *vice versa.*